

SEQUENCE LISTING

<110> WAKO PURE CHEMICAL INDUSTRIES, LTD.

5 <120> Hybrid Enzymes and Use Thereof

<130> WJ018

<140>

10 <141>

<160> 56

<170> PatentIn Ver. 2.1

15

<210> 1

<211> 206

<212> PRT

<213> Human

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<400> 1

Gln Thr Asp Met Ser Arg Lys Ala Phe Val Phe Pro Lys Glu Ser Asp

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25 Thr Ser Tyr Val Ser Leu Lys Ala Pro Leu Thr Lys Pro Leu Lys Ala

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25

30

09879257-061201
102190-526/860

Phe Thr Val Cys Leu His Phe Tyr Thr Glu Leu Ser Ser Thr Arg Gly

35

40

45

Tyr Ser Ile Phe Ser Tyr Ala Thr Lys Arg Gln Asp Asn Glu Ile Leu

5

50

55

60

Ile Phe Trp Ser Lys Asp Ile Gly Tyr Ser Phe Thr Val Gly Gly Ser

65

70

75

80

10 Glu Ile Leu Phe Glu Val Pro Glu Val Thr Val Ala Pro Val His Ile

85

90

95

Cys Thr Ser Trp Glu Ser Ala Ser Gly Ile Val Glu Phe Trp Val Asp

100

105

110

15

Gly Lys Pro Arg Val Arg Lys Ser Leu Lys Lys Gly Tyr Thr Val Gly

115

120

125

Ala Glu Ala Ser Ile Ile Leu Gly Gln Glu Gln Asp Ser Phe Gly Gly

20

130

135

140

Asn Phe Glu Gly Ser Gln Ser Leu Val Gly Asp Ile Gly Asn Val Asn

145

150

155

160

25 Met Trp Asp Phe Val Leu Ser Pro Asp Glu Ile Asn Thr Ile Tyr Leu

165

170

175

09879257 061201
FOET90" 25262860

Gly Gly Pro Phe Ser Pro Asn Val Leu Asn Trp Arg Ala Leu Lys Tyr

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Glu Val Gln Gly Glu Val Phe Thr Lys Pro Gln Leu Trp Pro

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<210> 2

<211> 16

10 <212> PRT

<213> Human

<400> 2

Asp Met Ser Arg Lys Ala Phe Val Phe Pro Lys Glu Ser Asp Thr Ser

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<210> 3

<211> 27

20 <212> PRT

<213> Human

<400> 3

Leu Val Gly Asp Ile Gly Asn Val Asn Met Trp Asp Phe Val Leu Ser

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1

5

10

15

Pro Asp Glu Ile Asn Thr Ile Tyr Leu Gly Gly

09879257.061201
102190.5264860

20

25

<210> 4

5 <211> 12

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<213> Human

<400> 4

10 Leu Lys Lys Gly Tyr Thr Val Gly Ala Glu Ala Ser

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15 <211> 10

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<213> Human

<400> 5

20 Arg Ala Leu Lys Tyr Glu Val Gln Gly Glu

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<210> 6

25 <211> 486

<212> PRT

<213> Leuconostoc mesenteroides

FOI 90-061201 09879257 25262860

<400> 6

Met Val Ser Glu Ile Lys Thr Leu Val Thr Phe Phe Gly Gly Thr Gly

1 5 10 15

5

Asp Leu Ala Lys Arg Lys Leu Tyr Pro Ser Val Phe Asn Leu Tyr Lys

20 25 30

Lys Gly Tyr Leu Gln Lys His Phe Ala Ile Val Gly Thr Ala Arg Gln

10 35 40 45

Ala Leu Asn Asp Asp Glu Phe Lys Gln Leu Val Arg Asp Ser Ile Lys

50 55 60

15 Asp Phe Thr Asp Asp Gln Ala Gln Ala Glu Ala Phe Ile Glu His Phe

65 70 75 80

Ser Tyr Arg Ala His Asp Val Thr Asp Ala Ala Ser Tyr Ala Val Leu

85 90 95

20

Lys Glu Ala Ile Glu Glu Ala Ala Asp Lys Phe Asp Ile Asp Gly Asn

100 105 110

Arg Ile Phe Tyr Met Ser Val Ala Pro Arg Phe Phe Gly Thr Ile Ala

25 115 120 125

Lys Tyr Leu Lys Ser Glu Gly Leu Leu Ala Asp Thr Gly Tyr Asn Arg

T02T90" 25262860

130

135

140

Leu Met Ile Glu Lys Pro Phe Gly Thr Ser Tyr Asp Thr Ala Ala Glu

145

150

155

160

5

Leu Gln Asn Asp Leu Glu Asn Ala Phe Asp Asp Asn Gln Leu Phe Arg

165

170

175

Ile Asp His Tyr Leu Gly Lys Glu Met Val Gln Asn Ile Ala Ala Leu

10

180

185

190

Arg Phe Gly Asn Pro Ile Phe Asp Ala Ala Trp Asn Lys Asp Tyr Ile

195

200

205

15

Lys Asn Val Gln Val Thr Leu Ser Glu Val Leu Gly Val Glu Glu Arg

210

215

220

Ala Gly Tyr Tyr Asp Thr Ala Gly Ala Leu Leu Asp Met Ile Gln Asn

225

230

235

240

20

His Thr Met Gln Ile Val Gly Trp Leu Ala Met Glu Lys Pro Glu Ser

245

250

255

Phe Thr Asp Lys Asp Ile Arg Ala Ala Lys Asn Ala Ala Phe Asn Ala

25

260

265

270

Leu Lys Ile Tyr Asp Glu Ala Glu Val Asn Lys Tyr Phe Val Arg Ala

T02790" 061201

275

280

285

Gln Tyr Gly Ala Gly Asp Ser Ala Asp Phe Lys Pro Tyr Leu Glu Glu

290

295

300

5

Leu Asp Val Pro Ala Asp Ser Lys Asn Asn Thr Phe Ile Ala Gly Glu

305

310

315

320

Leu Gln Phe Asp Leu Pro Arg Trp Glu Gly Val Pro Phe Tyr Val Arg

10

325

330

335

Ser Gly Lys Arg Leu Ala Ala Lys Gln Thr Arg Val Asp Ile Val Phe

340

345

350

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Lys Ala Gly Thr Phe Asn Phe Gly Ser Glu Gln Glu Ala Gln Glu Ala

355

360

365

Val Leu Ser Ile Ile Ile Asp Pro Lys Gly Ala Ile Glu Leu Lys Leu

370

375

380

20

Asn Ala Lys Ser Val Glu Asp Ala Phe Asn Thr Arg Thr Ile Asp Leu

385

390

395

400

Gly Trp Thr Val Ser Asp Glu Asp Lys Lys Asn Thr Pro Glu Pro Tyr

25

405

410

415

Glu Arg Met Ile His Asp Thr Met Asn Gly Asp Gly Ser Asn Phe Ala

T02T90" 05262860

420

425

430

Asp Trp Asn Gly Val Ser Ile Ala Trp Lys Phe Val Asp Ala Ile Ser

435

440

445

5

Ala Val Tyr Thr Ala Asp Lys Ala Pro Leu Glu Thr Tyr Lys Ser Gly

450

455

460

Ser Met Gly Pro Glu Ala Ser Asp Lys Leu Leu Ala Ala Asn Gly Asp

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Ala Trp Val Phe Lys Gly

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<210> 7

<211> 39

<212> DNA

<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 7

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ataaggggta caccatgggtt tcagaaatca agacgttag

39

09879557.061201
T02T90" 25262860

<210> 8

<211> 30

<212> DNA

<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 8

10 ttcccggtt ttaattaacc tttaaacacc

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<210> 9

<211> 30

15 <212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

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<400> 9

tggttggtta gctatggaaa aaccagaatc

30

25 <210> 10

<211> 34

<212> DNA

FOR 90" / 526/860

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

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<400> 10

taggatccag gtacgtctaa ttcttcaagg tatg

34

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<210> 11

<211> 32

<212> DNA

<213> Artificial Sequence

15

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 11

atggatccgc tgattctaaa aacaatacct tc

32

20

<210> 12

<211> 25

<212> DNA

25

<213> Artificial Sequence

<220>

09879257.061204
T02T90"/526/860

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 12

aagcttgcat gcctgcaggt tcccg

25

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<210> 13

<211> 54

<212> DNA

10 <213> Artificial Sequence

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15 <223> Description of Artificial Sequence: Oligonucleotides consisting of the DNA coding for amino acids of Sequence 2, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

<400> 13

gatccgacat gtcgaggaag gcttttgtgt ttcccaaaga gtcggatact tccg

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<210> 14

<211> 54

<212> DNA

<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence: Complementary DNA of Sequence 13

09879257 061201
T02T90 25262860

<400> 14

gatccggaag tatccgactc tttgggaaac acaaaagcct tcctcgacat gtcg 54

5

<210> 15

<211> 48

<212> DNA

<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence: Oligonucleotide consisting of the DNA coding for partial amino acids of Sequence 3, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

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<400> 15

gatccgtgct gtcaccagat gagattaaca ccatttatct tggcgggg 48

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<210> 16

<211> 48

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Complementary DNA of Sequence 15

09079257 051204
T02F90" /526/860

<400> 16

gatcccccgc caagatagat ggtgttaatc tcatctggtg acagcacg

48

5 <210> 17

<211> 42

<212> DNA

<213> Artificial Sequence

10 <220>

<223> Description of Artificial Sequence: Oligonucleotide consisting of the DNA coding for amino acids of Sequence 4, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

15 <400> 17

gatccctgaa gaagggatac actgtggggg cagaagcaag cg

42

<210> 18

20 <211> 42

<212> DNA

<213> Artificial Sequence

<220>

25 <223> Description of Artificial Sequence: Complementary DNA of Sequence 17

<400> 18

09879257 061201

42

5 $\langle 211 \rangle$ 36

⟨213⟩ Artificial Sequence

10 <223> Description of Artificial Sequence: Oligonucleotide consisting of
the DNA coding for amino acids of Sequence 5, and a partial restriction
site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

15 gatccccgggc actgaagtat gaagtgcgaag gcgaag

<211> 36

20 <212> DNA

<213> Artificial Sequence

<223> Description of Artificial Sequence: Complementary DNA of Sequence 19

25

<400> 20

gaccttcgc cttgcacttc atacttcagt gcccg

36

<210> 23

<211> 33

<212> DNA

5 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide Primer

10 <400> 23

taggatccgt ctaattcttc aaggtatggc ttg

33

<210> 24

15 <211> 34

<212> DNA

<213> Artificial Sequence

<220>

20 <223> Description of Artificial Sequence: Oligonucleotide Primer

<400> 24

aaggatccgt acctgctgat tctaaaaaca atac

34

25

<210> 25

<211> 32

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T02T90.5262860

<212> DNA

<213> Artificial Sequence

<220>

5

<400> 25

ttggatccag caggtacgtc taattcttca ag

32

10 <210> 26

<211> 33

<212> DNA

<213> Artificial Sequence

15 <220>

<223> Description of Artificial Sequence: Oligonucleotide Primer

<400> 26

taggatccga ttctaaaaac aataccttca tcg

33

20

<210> 27

<211> 34

<212> DNA

25 <213> Artificial Sequence

<220>

FOI 90-05262850

<223> Description of Artificial Sequence: Oligonucleotide Primer

<400> 27

gggtgtttaa aggtggatcc taattaaagc ccgg

34

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<210> 28

<211> 32

<212> DNA

10 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide Primer

15 <400> 28

taggatcctt ctgaaccaa gttaaacgtg cc

32

<210> 29

20 <211> 32

<212> DNA

<213> Artificial Sequence

<220>

25 <223> Description of Artificial Sequence: Oligonucleotide Primer

<400> 29

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T02T90" 25262850

atggatccca agaagcacia gaagctgtct tg

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<210> 30

5 <211> 1024

<212> PRT

<213> Escherichia coli

<400> 30

10 Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Arg Asp
1 5 10 15

Trp Glu Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro
20 25 30

15 Pro Phe Ala Ser Trp Arg Asn Ser Glu Glu Ala Arg Thr Asp Arg Pro
35 40 45

Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe
20 50 55 60

Pro Ala Pro Glu Ala Val Pro Glu Ser Trp Leu Glu Cys Asp Leu Pro
65 70 75 80

25 Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr
85 90 95

09879257.061201

Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro
 100 105 110

Pro Phe Val Pro Thr Glu Asn Pro Thr Gly Cys Tyr Ser Leu Thr Phe
 5 115 120 125

Asn Val Asp Glu Ser Trp Leu Gln Glu Gly Gln Thr Arg Ile Ile Phe
 130 135 140

10 Asp Gly Val Asn Ser Ala Phe His Leu Trp Cys Asn Gly Arg Trp Val
 145 150 155 160

Gly Tyr Gly Gln Asp Ser Arg Leu Pro Ser Glu Phe Asp Leu Ser Ala
 165 170 175

15 Phe Leu Arg Ala Gly Glu Asn Arg Leu Ala Val Met Val Leu Arg Trp
 180 185 190

Ser Asp Gly Ser Tyr Leu Glu Asp Gln Asp Met Trp Arg Met Ser Gly
 20 195 200 205

Ile Phe Arg Asp Val Ser Leu Leu His Lys Pro Thr Thr Gln Ile Ser
 210 215 220

25 Asp Phe His Val Ala Thr Arg Phe Asn Asp Asp Phe Ser Arg Ala Val
 225 230 235 240

09879257.061201
 T02T90.5264860

Leu Glu Ala Glu Val Gln Met Cys Gly Glu Leu Arg Asp Tyr Leu Arg

245

250

255

Val Thr Val Ser Leu Trp Gln Gly Glu Thr Gln Val Ala Ser Gly Thr

5

260

265

270

Ala Pro Phe Gly Gly Glu Ile Ile Asp Glu Arg Gly Gly Tyr Ala Asp

275

280

285

10 Arg Val Thr Leu Arg Leu Asn Val Glu Asn Pro Lys Leu Trp Ser Ala

290

295

300

Glu Ile Pro Asn Leu Tyr Arg Ala Val Val Glu Leu His Thr Ala Asp

305

310

315

320

15

Gly Thr Leu Ile Glu Ala Glu Ala Cys Asp Val Gly Phe Arg Glu Val

325

330

335

Arg Ile Glu Asn Gly Leu Leu Leu Leu Asn Gly Lys Pro Leu Leu Ile

20

340

345

350

Arg Gly Val Asn Arg His Glu His His Pro Leu His Gly Gln Val Met

355

360

365

25 Asp Glu Gln Thr Met Val Gln Asp Ile Leu Leu Met Lys Gln Asn Asn

370

375

380

09879257.061201
T02T90" 25262860

Phe Asn Ala Val Arg Cys Ser His Tyr Pro Asn His Pro Leu Trp Tyr
385 390 395 400

Thr Leu Cys Asp Arg Tyr Gly Leu Tyr Val Val Asp Glu Ala Asn Ile
5 405 410 415

Glu Thr His Gly Met Val Pro Met Asn Arg Leu Thr Asp Asp Pro Arg
420 425 430

10 Trp Leu Pro Ala Met Ser Glu Arg Val Thr Arg Met Val Gln Arg Asp
435 440 445

Arg Asn His Pro Ser Val Ile Ile Trp Ser Leu Gly Asn Glu Ser Gly
450 455 460

15 His Gly Ala Asn His Asp Ala Leu Tyr Arg Trp Ile Lys Ser Val Asp
465 470 475 480

20 Pro Ser Arg Pro Val Gln Tyr Glu Gly Gly Gly Ala Asp Thr Thr Ala
485 490 495

Thr Asp Ile Ile Cys Pro Met Tyr Ala Arg Val Asp Glu Asp Gln Pro
500 505 510

25 Phe Pro Ala Val Pro Lys Trp Ser Ile Lys Lys Trp Leu Ser Leu Pro
515 520 525

09879257-061201
T02T90" 25267860

Gly Glu Thr Arg Pro Leu Ile Leu Cys Glu Tyr Ala His Ala Met Gly

530

535

540

Asn Ser Leu Gly Gly Phe Ala Lys Tyr Trp Gln Ala Phe Arg Gln Tyr

5

545

550

555

560

Pro Arg Leu Gln Gly Gly Phe Val Trp Asp Trp Val Asp Gln Ser Leu

565

570

575

10

Ile Lys Tyr Asp Glu Asn Gly Asn Pro Trp Ser Ala Tyr Gly Gly Asp

580

585

590

Phe Gly Asp Thr Pro Asn Asp Arg Gln Phe Cys Met Asn Gly Leu Val

595

600

605

15

Phe Ala Asp Arg Thr Pro His Pro Ala Leu Thr Glu Ala Lys His Gln

610

615

620

Gln Gln Phe Phe Gln Phe Arg Leu Ser Gly Gln Thr Ile Glu Val Thr

20

625

630

635

640

Ser Glu Tyr Leu Phe Arg His Ser Asp Asn Glu Leu Leu His Trp Met

645

650

655

25

Val Ala Leu Asp Gly Lys Pro Leu Ala Ser Gly Glu Val Pro Leu Asp

660

665

670

09879257-061201
T02T90-45264860

Val Ala Pro Gln Gly Lys Gln Leu Ile Glu Leu Pro Glu Leu Pro Gln
 675 680 685

Pro Glu Ser Ala Gly Gln Leu Trp Leu Thr Val Arg Val Val Gln Pro
 5 690 695 700

Asn Ala Thr Ala Trp Ser Glu Ala Gly His Ile Ser Ala Trp Gln Gln
 705 710 715 720

10 Trp Arg Leu Ala Glu Asn Leu Ser Val Thr Leu Pro Ala Ala Ser His
 725 730 735

Ala Ile Pro His Leu Thr Thr Ser Glu Met Asp Phe Cys Ile Glu Leu
 740 745 750

15 Gly Asn Lys Arg Trp Gln Phe Asn Arg Gln Ser Gly Phe Leu Ser Gln
 755 760 765

Met Trp Ile Gly Asp Lys Lys Gln Leu Leu Thr Pro Leu Arg Asp Gln
 20 770 775 780

Phe Thr Arg Ala Pro Leu Asp Asn Asp Ile Gly Val Ser Glu Ala Thr
 785 790 795 800

25 Arg Ile Asp Pro Asn Ala Trp Val Glu Arg Trp Lys Ala Ala Gly His
 805 810 815

09879257-061201
 T02T90" 25262860

Tyr Gln Ala Glu Ala Ala Leu Leu Gln Cys Thr Ala Asp Thr Leu Ala
820 825 830

Asp Ala Val Leu Ile Thr Thr Ala His Ala Trp Gln His Gln Gly Lys
5 835 840 845

Thr Leu Phe Ile Ser Arg Lys Thr Tyr Arg Ile Asp Gly Ser Gly Gln
850 855 860

10 Met Ala Ile Thr Val Asp Val Glu Val Ala Ser Asp Thr Pro His Pro
865 870 875 880

Ala Arg Ile Gly Leu Asn Cys Gln Leu Ala Gln Val Ala Glu Arg Val
885 890 895

15 Asn Trp Leu Gly Leu Gly Pro Gln Glu Asn Tyr Pro Asp Arg Leu Thr
900 905 910

20 Ala Ala Cys Phe Asp Arg Trp Asp Leu Pro Leu Ser Asp Met Tyr Thr
915 920 925

Pro Tyr Val Phe Pro Ser Glu Asn Gly Leu Arg Cys Gly Thr Arg Glu
930 935 940

25 Leu Asn Tyr Gly Pro His Gln Trp Arg Gly Asp Phe Gln Phe Asn Ile
945 950 955 960

00879257.061201
T02T90.45264860

Ser Arg Tyr Ser Gln Gln Gln Leu Met Glu Thr Ser His Arg His Leu

965

970

975

Leu His Ala Glu Glu Gly Thr Trp Leu Asn Ile Asp Gly Phe His Met

5

980

985

990

Gly Ile Gly Gly Asp Asp Ser Trp Ser Pro Ser Val Ser Ala Glu Phe

995

1000

1005

10 Gln Leu Ser Ala Gly Arg Tyr His Tyr Gln Leu Val Trp Cys Gln Lys

1010

1015

1020

15

<210> 31

<211> 448

<212> PRT

20 <213> Escherichia coli

<400> 31

Thr Pro Glu Met Pro Val Leu Glu Asn Arg Ala Ala Gln Gly Asp Ile

1

5

10

15

25

Thr Ala Pro Gly Gly Ala Arg Arg Leu Thr Gly Asp Gln Thr Ala Ala

20

25

30

09679257-061201
T02T90" 25267860

Leu Arg Asp Ser Leu Ser Asp Lys Pro Ala Lys Asn Ile Ile Leu Leu

35

40

45

5 Ile Gly Asp Gly Met Gly Asp Ser Glu Ile Thr Ala Ala Arg Asn Tyr

50

55

60

Ala Glu Gly Ala Gly Gly Phe Phe Lys Gly Ile Asp Ala Leu Pro Leu

65

70

75

80

10

Thr Gly Gln Tyr Thr His Tyr Ala Leu Asn Lys Lys Thr Gly Lys Pro

85

90

95

Asp Tyr Val Thr Asp Ser Ala Ala Ser Ala Thr Ala Trp Ser Thr Gly

15

100

105

110

Val Lys Thr Tyr Asn Gly Ala Leu Gly Val Asp Ile His Glu Lys Asp

115

120

125

20 His Pro Thr Ile Leu Glu Met Ala Lys Ala Ala Gly Leu Ala Thr Gly

130

135

140

Asn Val Ser Thr Ala Glu Leu Gln Asp Ala Thr Pro Ala Ala Leu Val

145

150

155

160

25

Ala His Val Thr Ser Arg Lys Cys Tyr Gly Pro Ser Ala Thr Ser Glu

165

170

175

09879257-061201
T02T90" 25262860

Lys Cys Pro Gly Asn Ala Leu Glu Lys Gly Gly Lys Gly Ser Ile Thr

180

185

190

5 Glu Gln Leu Leu Asn Ala Arg Ala Asp Val Thr Leu Gly Gly Gly Ala

195

200

205

Lys Thr Phe Ala Glu Thr Ala Thr Ala Gly Glu Trp Gln Gly Lys Thr

210

215

220

10

Leu Arg Glu Gln Ala Gln Ala Arg Gly Tyr Gln Leu Val Ser Asp Ala

225

230

235

240

Ala Ser Leu Asn Ser Val Thr Glu Ala Asn Gln Gln Lys Pro Leu Leu

15

245

250

255

Gly Leu Phe Ala Asp Gly Asn Met Pro Val Arg Trp Leu Gly Pro Lys

260

265

270

20 Ala Thr Tyr His Gly Asn Ile Asp Lys Pro Ala Val Thr Cys Thr Pro

275

280

285

Asn Pro Gln Arg Asn Asp Ser Val Pro Thr Leu Ala Gln Met Thr Asp

290

295

300

25

Lys Ala Ile Glu Leu Leu Ser Lys Asn Glu Lys Gly Phe Phe Leu Gln

305

310

315

320

09879257-061201
T02T90-25262860

Val Glu Gly Ala Ser Ile Asp Lys Gln Asp His Ala Ala Asn Pro Cys

325

330

335

5 Gly Gln Ile Gly Glu Thr Val Asp Leu Asp Glu Ala Val Gln Arg Ala

340

345

350

Leu Glu Phe Ala Lys Lys Glu Gly Asn Thr Leu Val Ile Val Thr Ala

355

360

365

10

Asp His Ala His Ala Ser Gln Ile Val Ala Pro Asp Thr Lys Ala Pro

370

375

380

Gly Leu Thr Gln Ala Leu Asn Thr Lys Asp Gly Ala Val Met Val Met

15

385

390

395

400

Ser Tyr Gly Asn Ser Glu Glu Asp Ser Gln Glu His Thr Gly Gln Leu

405

410

415

20

Arg Ile Ala Ala Tyr Gly Pro His Ala Ala Asn Val Val Gly Leu Thr

420

425

430

Asp Gln Thr Asp Leu Phe Tyr Thr Met Lys Ala Ala Leu Gly Leu Lys

435

440

445

25

<210> 32

<211> 45

090955 061201
FOI 90-5264860

<212> DNA

<213> Artificial Sequence

<220>

- 5 <223> Description of Artificial Sequence: Oligonucleotides consisting of the DNA coding for partial amino acids of Sequence 2, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

10 <400> 32

gatccgacat gtcgaggaag gcttttgtgt ttcccaaaga gtcgg

45

<210> 33

15 <211> 45

<212> DNA

<213> Artificial Sequence

<220>

- 20 <223> Description of Artificial Sequence: Complementary DNA of Sequence 32

<400> 33

gatcccgact ctttgggaaa cacaaaagcc ttctctgaca tgtcg

45

25

<210> 34

09879257.061201

<211> 36

<212> DNA

<213> Artificial Sequence

5 <220>

<223> Description of Artificial Sequence: Oligonucleotides consisting of the DNA coding for partial amino acids of Sequence 2, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

10

<400> 34

gatccaggaa ggcttttgtg tttcccaaag agtcgg 36

15 <210> 35

<211> 36

<212> DNA

<213> Artificial Sequence

20 <220>

<223> Description of Artificial Sequence: Complementary DNA of Sequence 34

<400> 35

gatcccgact ctttgggaaa cacaaaagcc ttcctg 36

25

09879257.061201

<210> 36

<211> 36

<212> DNA

<213> Artificial Sequence

5

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 36

10 cacaggaaac agaccatggg atccgtttca gaaatc 36

<210> 37

<211> 32

15 <212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

20

<400> 37

ttggatccat caccggcacc atattgtgca cg.. 32

25 <210> 38

<211> 33

<212> DNA

09879257.061201
T02T90.5262860

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Oligonucleotide primer

5

<400> 38

aaggatcctc agctgacttc aagccatacc ttg 33

10 <210> 39

<211> 31

<212> DNA

<213> Artificial Sequence

15 <220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 39

aaggatccaa ggtatggctt gaagtcagct g 31

20

<210> 40

<211> 31

<212> DNA

25 <213> Artificial Sequence

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<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 40

aaggatccaa ggtatggctt gaagtcagct g 31

5

<210> 41

<211> 30

<212> DNA

10 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

15 <400> 41

ggtacgtata attcatcaag gtatggcttg 30

<210> 42

20 <211> 26

<212> DNA

<213> Artificial Sequence

<220>

25 <223> Description of Artificial Sequence: Oligonucleotide primer

<400> 42

09879257-061204
T02T90-25262860

tatacgtacc tgctgattct aaaaac

26

<210> 43

5 <211> 30

<212> DNA

<213> Artificial Sequence

<220>

10 <223> Description of Artificial Sequence: Oligonucleotides consisting of the DNA coding for partial amino acids of Sequence 2 .

<400> 43

aggaaggctt ttgtgtttcc caaagagtcg

30

15

<210> 44

<211> 30

<212> DNA

20 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Complementary DNA of Sequence 43

25 <400> 44

cgactctttg ggaaacacaa aagccttcct

30

09879257-061201

<210> 45

<211> 55

<212> PRT

<213> Hepatitis B virus

5

<400> 45

Met Gln Trp Asn Ser Thr Ala Phe His Gln Ala Leu Gln Asp Pro Arg

1

5

10

15

10 Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val

20

25

30

Asn Pro Ala Pro Asn Ile Ala Ser His Ile Ser Ser Ile Ser Ala Arg

35

40

45

Thr Gly Asp Pro Val Thr Asn

15

50

55

<210> 46

<211> 12

20 <212> PRT

<213> Hepatitis B virus

<400> 46

Asp Pro Arg Val Arg Gly Leu Tyr Phe Pro Ala Gly

25

1

5

10

09879257.061201

<210> 47

<211> 42

<212> DNA

5 <213> Artificial Sequence

<220>

10 <223> Description of Artificial Sequence: Oligonucleotides consisting of the DNA coding for amino acids of Sequence 46, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

<400> 47

gatccgaccc gcgtgttcgt ggtctgtatt tcccggctgg tg 42

15

<210> 48

<211> 42

<212> DNA

<213> Artificial Sequence

20

<220>

<223> Description of Artificial Sequence: Complementary DNA of Sequence 47

<400> 48

25 gatccaccag ccgggaaata cagaccacga acacgcgggt cc 42

T02T90" 0526/860

<210> 49

<211> 84

<212> PRT

5 <213> Human

<400> 49

Ala Val Ser Glu Ile Gln Phe Met His Asn Leu Gly Lys His Leu Ser

1 5 10 15

10 Ser Met Glu Arg Val Glu Trp Leu Arg Lys Lys Leu Gln Asp Val His

20 25 30

Asn Phe Val Ala Leu Gly Ala Ser Ile Ala Tyr Arg Asp Gly Ser Ser

35 40 45

Gln Arg Pro Arg Lys Lys Glu Asp Asn Val Leu Val Glu Ser His Gln

15 50 55 60

Lys Ser Leu Gly Glu Ala Asp Lys Ala Asp Val Asp Val Leu Ile Lys

65 70 75 80

Ala Lys Pro Gln

20

<210> 50

<211> 15

<212> PRT

<213> Human

25

<400> 50

Glu Arg Val Glu Trp Leu Arg Lys Lys Leu Gln Asp Val His Asn

09879257 061201

1

5

10

15

<210> 51

5 <211> 51

<212> DNA

<213> Artificial Sequence

<220>

10 <223> Description of Artificial Sequence: Oligonucleotides consisting of the DNA coding for amino acids of Sequence 50, and a partial restriction site of BamHI consisting of 5' end of "gatcc" and 3' end of "g".

<400> 51

15 gatccgaacg tgttgaatgg ctgcgtaaaa aactgcagga cggtcataac g 51

<210> 52

<211> 51

20 <212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Complementary DNA of Sequence 51

25

<400> 52

09879257.061201

gatccggttat gaacgtcctg cagtttttta cgcagccatt caacacgttc g 51

<210> 53

5 <211> 28

<212> DNA

<213> Artificial Sequence

<220>

10 <223> Description of Artificial Sequence: Oligonucleotide primer

<400> 53

tatgaccatg attacggatt cactggcc 28

15

<210> 54

<211> 26

<212> DNA

<213> Artificial Sequence

20

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 54

25 ctgcccggtt attattattt ttgacaccag 26

09879257.061201
T02T90" 25262860

<210> 55

<211> 31

<212> DNA

<213> Artificial Sequence

5

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

<400> 55

10 taggataccta cgccaatgtc gttatccagc g 31

<210> 56

<211> 30

15 <212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligonucleotide primer

20

<400> 56

ttggatccag tgaagcgacc cgcattgacc 30

09070257.061201